

Claims

[c1] 1. A seamless flexible electrostatographic imaging member belt fabrication method comprising:
providing a flexible substrate support sheet;
producing first desired features on a first portion of the substrate support sheet, including removing material from the substrate support sheet with first emissions;
producing second desired features on a second portion of the substrate support sheet complementary to the first desired features, including removing material from the substrate support sheet with second emissions;
overlapping the first and second desired features;
bonding the first desired pattern with the second desired pattern to produce a seamed belt; and
applying at least one coating to the substrate support sheet.

[c2] 2. The method of claim 1 wherein removing material from the substrate with emissions includes inducing a desired shape in at least one of the first and second emissions by passing the at least one of the first and second emissions through a mask.

[c3] 3. The method of claim 2 wherein inducing a desired shape in the emissions further includes passing the at least one of the first and second emissions through at least one additional mask, the at least one additional mask inducing features of the desired shape in the emissions.

[c4] 4. The method of claim 1 wherein removing material from the substrate with first emissions includes producing a laser beam, passing the laser beam through a mask, and illuminating the first portion of the substrate support sheet with the laser beam.

[c5] 5. The method of claim 4 wherein removing material from the substrate with first emissions further includes inducing relative motion between the laser beam and the substrate support sheet.

[c6] 6. The method of claim 1 wherein removing material from the substrate with

first emissions includes producing a particle beam, passing the particle beam through a mask, and bombarding the first portion of the substrate support sheet with the particle beam.

- [c7] 7. The method of claim 6 wherein producing a particle beam includes producing an electron beam.
- [c8] 8. The method of claim 1 further comprising coating the seamed belt with a photoconductive material.
- [c9] 9. The method of claim 1 wherein bonding comprises ultrasonically welding.
- [c10] 10. The method of claim 1 wherein the emissions comprise electromagnetic radiation.
- [c11] 11. A seamless flexible electrostatographic imaging member belt fabrication method comprising:
 - providing a flexible substrate support sheet;
 - illuminating a first part of the substrate support sheet with a laser beam to produce first desired features on the substrate support sheet, wherein the first desired features include portions of the substrate support sheet from which material has been removed;
 - moving the substrate support sheet relative to the laser beam such that a desired first pattern is fabricated along a first edge of the substrate support sheet;
 - illuminating a second part of the substrate support sheet with a laser beam to produce second desired features on the substrate support sheet, wherein the desired features include portions of the substrate support sheet from which material has been removed;
 - moving the substrate support sheet relative to the laser beam such that a second desired pattern is fabricated along a second edge of the substrate support sheet;
 - overlapping and bonding the first desired pattern with the second desired pattern to produce a seamed belt; and
 - coating the seamed belt with a photoconductive material.

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[c12] 12. The method of fabricating a seamed flexible belt according to claim 11 wherein the illuminating a first part of the flexible substrate support sheet with a laser beam to produce first desired features on the substrate support sheet includes:

generating a laser beam;

spreading the laser beam;

illuminating a patterned mask such that parts of the spread laser beam pass through the mask as machining light; and

directing the machining light onto the first part of the substrate support sheet.

[c13] 13. The method of fabricating a seamed flexible belt according to claim 11 wherein the first edge and the second edge take the form of a puzzle cut pattern, and wherein the overlapping and bonding includes placing an adhesive over the first and second patterns, mating the puzzle-cut seams, and curing the adhesive.

[c14] 14. The method of fabricating a seamed belt according to claim 12 wherein the first and second patterns form a rabbeted joint.

[c15] 15. The method of fabricating a seamed belt according to claim 13 wherein the first and second patterns form a rabbeted joint.

[c16] 16. A seamless flexible electrostatographic imaging member belt fabrication method comprising:

providing a flexible substrate support sheet;

bombarding a first portion of the substrate support sheet with first emissions to produce first desired features;

bombarding a second portion of the substrate support sheet with second emissions to produce second desired features complementary to the first desired features;

mating the first and second desired features;

bonding the first desired features with the second desired features to produce a substantially seamless belt; and

applying at least one coating to the belt.

[c17] 17. The method of claim 17 bombarding a second portion includes bombarding an opposite surface of an opposite end of the sheet.

[c18] 18. The method of claim 17 wherein applying at least one coating includes applying a photoconductive coating.

[c19] 19. The method of claim 17 wherein providing a substrate support sheet comprises providing a single layer of substantially homogeneous material.

[c20] 20. The method of claim 19 wherein providing a flexible substrate sheet further comprises providing a sheet of PET.

[c21] 21. A seamless flexible electrostatographic imaging member belt fabrication method comprising:
providing a flexible substrate support sheet;
producing first desired features on a first portion of the substrate support sheet, including removing material from the substrate support sheet with first emissions;
producing second desired features on a second portion of the substrate support sheet complementary to the first desired features, including removing material from the substrate support sheet with second emissions;
removing material from the substrate with first and second emissions including inducing a desired shape in at least one of the first and second emissions by passing the at least one of the first and second emissions through at least one mask;
removing material from the substrate with first emissions further including inducing relative motion between the laser beam and the substrate support sheet;
overlapping the first and second desired features;
bonding the first desired features with the second desired features to produce a substantially seamless belt; and
applying at least one coating the substrate support sheet, the at least one coating including a photoconductive coating.

[c22] 22. The method of claim 21 wherein bonding comprises ultrasonically welding.